9551 31

PRC Environmental Management, Inc.
233 North Michigan Avenue
Suite 1621
Chicago, IL 60601
312-856-8700
Fax 312-938-0118

FOCUSED SITE INSPECTION PRIORITIZATION
SITE EVALUATION REPORT

OHIO POWER COMPANY, PHILO PLANT
PHILO, OHIO

EPA IDENTIFICATION NO. OHD 980 42 3347

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Site Assessment Section
77 West Jackson Boulevard
Chicago, IL 60604

Date Prepared	:	May 3, 1995
EPA Region	:	5
Contract No.	:	68-W8-0084
Work Assignment No.	:	35-5JZZ
PRC Project No.	:	030-0035101
Prepared by	:	PRC Environmental Management, Inc. (Jeff Leto)
PRC Project Manager	:	Christopher Scott
Telephone No.	:	312/856-8700
EPA Work Assignment Manager	:	Jeanne Griffin
Telephone No.	:	312/886-3007

CONTENTS

FIGURES

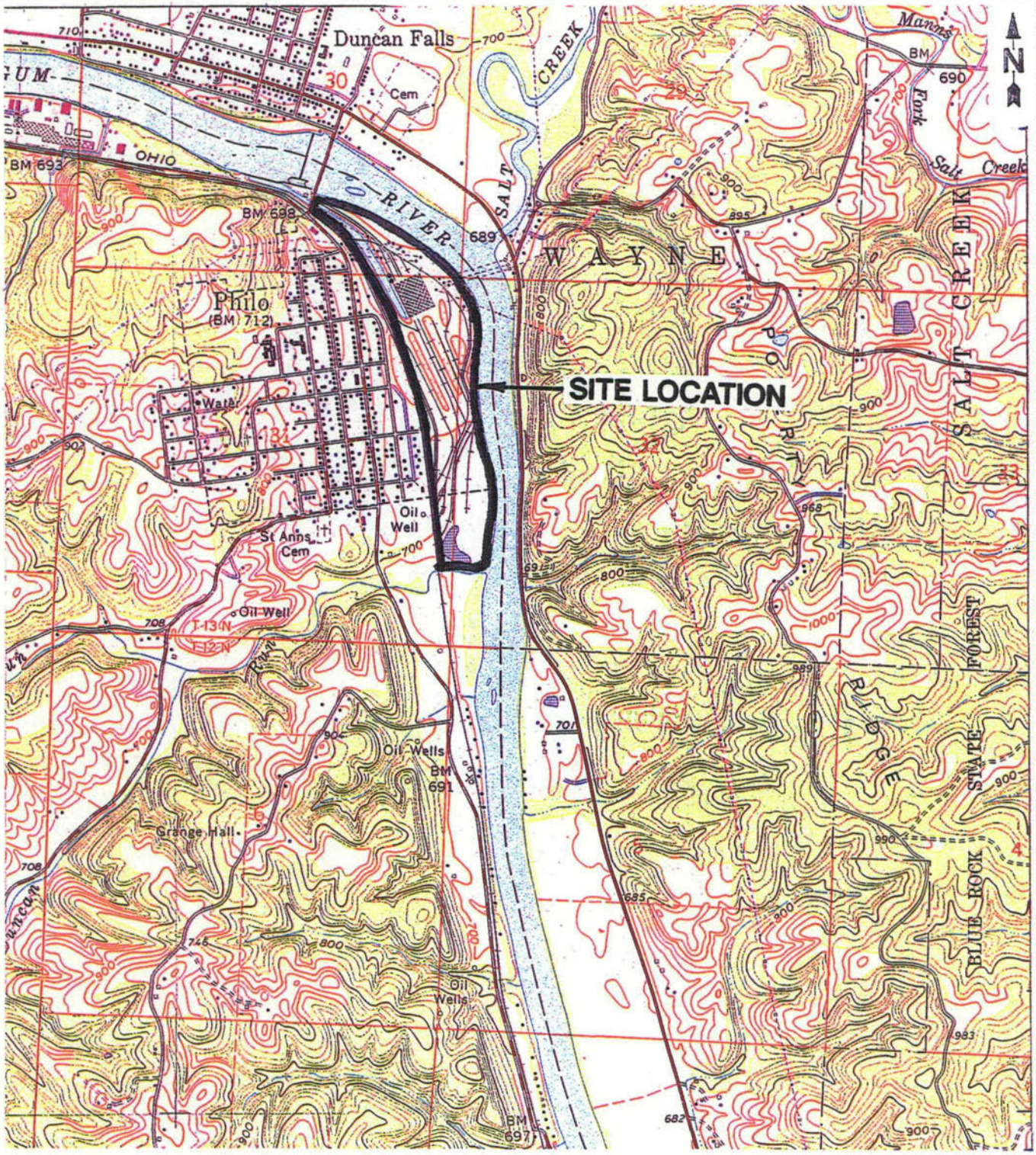
1.0 INTRODUCTION

Under Contract No. 68-W8-0084, Work Assignment No. 35-5JZZ, PRC Environmental Management, Inc. (PRC), has evaluated the Ohio Power Company, Philo Plant (Philo Plant), site in Philo, Muskingum County, Ohio, as a potential candidate for the National Priorities List (NPL) and has prepared this site evaluation report. Using the Hazard Ranking System (HRS), PRC performed focused site inspection prioritization (FSIP) activities for the site to determine whether, or to what extent, it poses a threat to human health and the environment. This report presents the results of PRC's evaluation and summarizes the site conditions and targets pertinent to the migration and exposure pathways associated with the site. Information was obtained from preliminary assessment (PA) and screening site inspection (SSI) reports; U.S. Environmental Protection Agency (EPA) files; Ohio Environmental Protection Agency (OEPA) files; and a site reconnaissance conducted by PRC on February 22, 1995.

This report has five sections, including this introduction. Section 2.0 describes the site and provides a brief site history. Section 3.0 provides information about previous investigations conducted at the site. Section 4.0 provides information about the four migration and exposure pathways (groundwater migration, surface water migration, soil exposure, and air migration) that can be scored. Section 5.0 summarizes conditions at the site. References used in the preparation of this report are listed at the end of the text. In addition, the appendix to this report contains photographs taken during the site reconnaissance.

2.0 SITE DESCRIPTION AND HISTORY

The Philo Plant site is an inactive, coal fired electrical power plant that was operated by the Ohio Power Company from October 1924 until the plant closed in May 1975 (Ohio Power Company 1975). The plant occupied 114.7 acres immediately east of the Town of Philo on the Muskingum River in Philo, Ohio. The Philo Plant site coordinates are 39°51'49" N latitude and 81°54'19" W longitude (USGS 1975a). The site's location is shown in Figure 1. The site is bordered to the east and the north by the Muskingum River, to the west by residences, and to the south by Duncan Run. A lock and dam is located approximately 1,300 feet northeast of the site on the Muskingum River



SCALE 1:24000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

SCALE: 1" = 2,000'

SOURCE: MODIFIED FROM USGS;
PHILO, OHIO, QUADRANGLE, 1975

QUADRANGLE LOCATION

OHIO POWER COMPANY, PHILO PLANT
PHILO, OHIO

FIGURE 1
SITE LOCATION

PRC ENVIRONMENTAL MANAGEMENT, INC.

(USGS 1975a). After the plant closed, all buildings were demolished and removed. Since 1975, the site has remained vacant except for a small electrical substation that the Ohio Power Company operates (E&E 1991). The Ohio Power Company still owns the site. Site land use before 1924 is unknown. Until 1990, the site was relatively devoid of vegetation. Some time during 1990, the site was seeded (PRC 1995c).

The Philo Plant site formerly consisted of six power generating turbines capable of producing 33 to 100 megawatts of electricity (OEPA 1987). Temperature control of the power generating system was maintained with cooling water from the Muskingum River. Cooling water was brought into the Philo Plant site using a subsurface cooling water influent canal. This underground canal extends south from 500 feet north of the dam to midway through the site (E&E 1991). After use, the water was discharged back into the Muskingum River at two outfall locations located east of the electrical substation (see Photograph No. 1). Waste fly ash and bottom ash produced from burning coal were mixed with water to form a slurry. The slurry was then placed in one of the two surface impoundments located south of the electrical substation (see Photographs No. 2 and 3). Only one surface impoundment was operated at a time. The slurry was allowed to settle in the surface impoundments. When one surface impoundment was filled with ash, the second was used while the first was drained and dredged.

The sludge in the surface impoundments was then placed in the ash disposal area occupying 30 acres in the southern portion of the site. The eastern side of the ash disposal area is bermed. Water from the ash disposal area drained to the Muskingum River through an outfall located on the southeast side of the site. Information regarding ultimate disposal of the sludge is unavailable. Supernatant water drained from the surface impoundments into Clearwater Pond (see Photograph No. 4). Water from Clearwater Pond was then discharged to the Muskingum River through a National Pollutant Discharge Elimination System (NPDES) permitted outfall (PRC 1995c). Discharge from Clearwater Pond was regulated under NPDES Permit No. B 004 *AD from 1971 until it was revoked in 1981, after the Philo Plant site had closed (OEPA 1981). No other information regarding the NPDES permit is available. The two surface impoundments used to store waste fly ash and bottom ash and Clearwater Pond occupy a total of approximately 2.6 acres.

The site also contained two coal piles located near the railroad tracks where the coal was unloaded from freight cars. Both areas still contain substantial amounts of residual coal (see Photographs No. 5

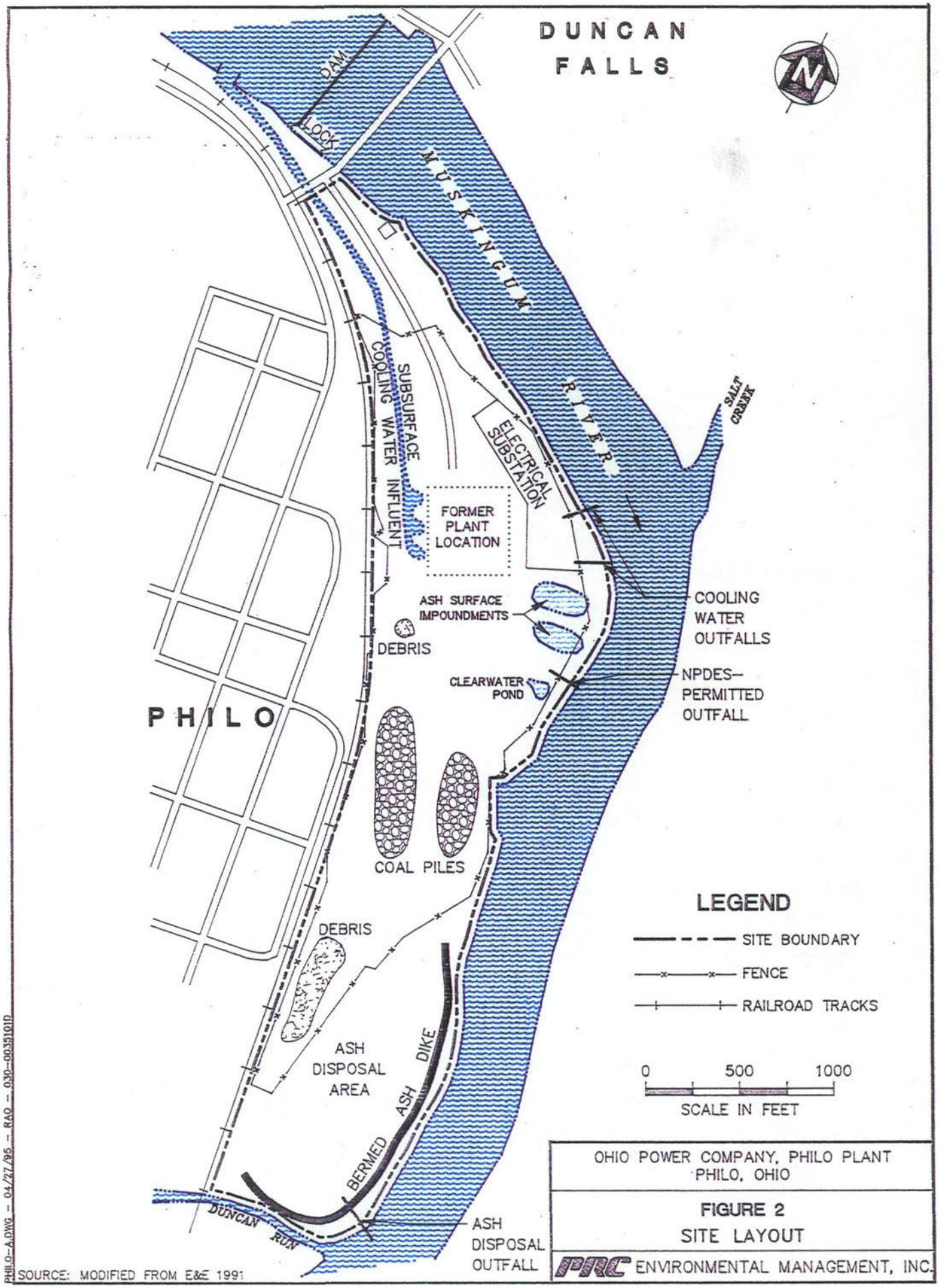
and 6). Two debris piles are also located on site. The debris piles apparently consist mostly of bricks from the former buildings. One debris pile is located south of the former plant location, and the second is located west of the ash disposal area (E&E 1991). A site layout is presented in Figure 2.

3.0 PREVIOUS INVESTIGATIONS

Initial regulatory activity began at the Philo Plant in June 1971 when the Ohio Power Company filed for a NPDES permit to regulate surface impoundment discharge into the Muskingum River (OEPA 1981). OEPA conducted a preliminary assessment (PA) for the site in 1987 (OEPA 1987). After the PA, the EPA Field Investigation Team (FIT) conducted an SSI at the site on February 20 and 21, 1990 (E&E 1991).

During the SSI, five surface soil samples, three sediment samples, one background soil sample (S9), and one background sediment sample (S10) were collected approximately 0.5 mile west of the Philo Plant site. Sediment sample S10 was collected from the Muskingum River. Soil samples S1 and S2 were collected near the north surface impoundment. Soil sample S3 was collected near the southern surface impoundment. Soil sample S4 was collected south of Clearwater Pond. Soil sample S5 was collected from the ash disposal area. Sediment samples S6, S7, and S8 were collected near the west bank of the Muskingum River. Sample S6 was collected downstream of the NPDES-permitted outfall. Sample S7 was collected near the southern cooling water outfall. Sample S8 was collected approximately 2,200 feet upstream of the northernmost outfall (E&E 1991). Analytical results and sampling locations are presented in Attachment A.

Analytical results from the above samples show contamination in both soil and sediment. No volatile organic compounds (VOC) or semivolatile organic compounds (SVOC) were detected in the background samples. Methylene chloride was detected above the contract-required detection limit (CRDL), which are presented in Attachment B, required under the contract laboratory program (CLP) in soil samples collected near the surface impoundments and from the ash disposal area. Tetrachloroethene was detected above CRDLs in on-site soil samples collected near the surface.


DUNCAN FALLS
DAM
LOCK
MUSKINGUM RIVER
SUBSURFACE COOLING WATER INFLUENT
ELECTRICAL SUBSTATION
SALT CREEK
FORMER PLANT LOCATION
ASH SURFACE IMPOUNDMENTS
DEBRIS
CLEARWATER POND
COOLING WATER OUTFALLS
NPDES–PERMITTED OUTFALL
PHILO
COAL PILES
DEBRIS
ASH DISPOSAL AREA
ASH DIKE
BERMED
DUNCAN RUN
ASH DISPOSAL OUTFALL
LEGEND
SITE BOUNDARY
FENCE
RAILROAD TRACKS
0 500 1000
SCALE IN FEET
OHIO POWER COMPANY, PHILO PLANT
PHILO, OHIO
FIGURE 2
SITE LAYOUT
PRC ENVIRONMENTAL MANAGEMENT, INC.
SOURCE: MODIFIED FROM E&E 1991
PHILO-A.DWG -- 04/27/95 -- RAO -- 030-0035101D

impoundments. Methylene chloride was also detected above CRDLs in on-site sediment samples. Naphthalene, 2-methylnaphthalene, phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, and benzo(b)fluoranthene were detected above CRDLs in the on-site soil samples collected near the surface impoundments. No SVOCs were detected above CRDLs in the on-site sediment samples. Aluminum, arsenic, beryllium, thallium, and mercury were detected in on-site soil samples collected near the surface impoundments and from the ash disposal area at concentrations significantly above background concentrations. Silver was also detected in soil samples collected near the surface impoundments at concentrations significantly above background concentrations. Antimony, mercury, and silver were also detected in sediment samples collected from near the site at concentrations significantly above background concentrations (E&E 1991).

4.0 MIGRATION AND EXPOSURE PATHWAYS

This section describes the four migration and exposure pathways associated with the Philo Plant site. Section 4.1 discusses the groundwater migration pathway; Section 4.2 discusses the surface water migration pathway; Section 4.3 discusses the soil exposure pathway; and Section 4.4 discusses the air migration pathway.

4.1 GROUNDWATER MIGRATION PATHWAY

This section discusses geology and soils, groundwater releases, and targets associated with the groundwater migration pathway at the site.

4.1.1 Geology and Soils

The Philo Plant site is located on a point bar in the flood plain of the Muskingum River. Soils in this area are characterized by alternating layers of silt, sand, and gravel deposits (E&E 1991). Bedrock in the area is present at 60 feet below ground surface (bgs) (OEPA 1987). The bedrock consists of Pennsylvanian Period sandstone and shale with some limestone and coal beds (E&E 1991). Because of the site's nearness to the Muskingum River, the river probably has a significant influence on groundwater flow direction. It is therefore assumed that groundwater at the site flows east to southeast toward the river. The depth to the shallowest aquifer under the site is unknown. The SSI report states

that Clearwater Pond was inundated with water during March 1991 (E&E 1991). It is therefore assumed that the groundwater elevation near Clearwater Pond is close to the ground surface because the pond is located on well drained soils with high infiltration rates characteristic of point bars. According to well logs from the area, drinking water is obtained from sand and gravel deposits at approximately 21 feet bgs. Attachment C presents a copy of area well log information from the Ohio Department of Natural Resources and U.S. Department of the Interior.

4.1.2 Groundwater Releases

No releases of hazardous substances to groundwater have been documented at the Philo Plant site; however, the potential for hazardous substances to migrate from contaminated soils to groundwater exists. Both Clearwater Pond and the two surface impoundments are unlined and had no leachate collection systems (OEPA 1987). During the 1990 SSI, four soil samples collected near both areas contained elevated levels of organic compounds and metals (E&E 1991). Because one sample collected from the ash disposal area contained elevated levels of VOCs and metals, the potential for a release of hazardous substances to groundwater from this area also exists.

4.1.3 Targets

The Town of Philo is located immediately west of the site. Approximately 1,000 Philo residents are supplied with drinking water from two municipal wells located approximately 0.25 mile south of the Philo Plant site (PRC 1995d). East of the Philo Plant site on the opposite side of the Muskingum River is the Town of Duncan Falls. Duncan Falls has a population of approximately 6,400 people who are supplied by two municipal wells located 0.5 mile northwest of the Philo Plant site (PRC 1995e). It is unlikely that these wells are affected by Philo Plant site contamination because the Muskingum River should act as a hydraulic barrier. The municipal wells are screened at approximately 65 feet bgs in sand and gravel. In addition to municipal wells, approximately 1,388 people within a 4-mile radius of the Philo Plant site use private wells as a source of potable water (Frost 1995).

4.2 SURFACE WATER MIGRATION PATHWAY

This section discusses the migration route, surface water releases, and targets associated with the surface water migration pathway at the site.

4.2.1 Migration Route

Surface soil and sediment contamination associated with the Philo Plant site could potentially migrate to the Muskingum River as a result of heavy precipitation or flooding. The Muskingum River is the only surface water body that can potentially receive hazardous substances from the site. The Philo Plant site is located in a naturally occurring, 100-year flood plain of the Muskingum River (FEMA 1988). The river has an average flow rate of 9,000 to 10,000 cubic feet per second and contains many locks and dams that allow some control of its flow rate, decreasing the potential for the river to flood (USGS 1992).

The surface impoundments can potentially release contaminants to the Muskingum River. Soil samples collected near the surface impoundments contained concentrations of VOCs, SVOCs, and metals at levels significantly above background concentrations (E&E 1991). The surface impoundments frequently discharged potentially contaminated wastewater that was used to treat fly and bottom ash into Clearwater Pond, which discharged the wastewater into the Muskingum River through a NPDES-permitted outfall.

A potential also exists for contaminants from the ash disposal area to be released to the surface water migration pathway. One soil sample collected from this area during the 1990 SSI was contaminated with elevated levels of VOCs and metals (E&E 1991). The ash disposal area is separated from the Muskingum River by a large berm. An outfall pipe on the east side of the berm appears to drain the disposal area and discharge directly into the river.

4.2.2 Surface Water Releases

During the 1990 SSI, three sediment samples were collected near two Philo Plant site outfalls. All three samples contained elevated levels of VOCs and metals. Based on analytical results from samples

collected on or near the site, a release of methylene chloride, mercury, and silver has occurred to the Muskingum River (E&E 1991). These compounds were detected at levels significantly above background levels in both on-site soil and sediment samples.

4.2.3 Targets

No drinking water intakes are located within 15 downstream miles of the Philo Plant site. The Muskingum River is used for recreational fishing and boating (PRC 1995b). An estimated 14,874 pounds of fish are caught within 15 miles downriver of the site and consumed annually (ODNR 1995). Between 1 and 2 linear miles of wetland habitat exist within 15 miles downriver of the site (DOI 1975). No threatened or endangered species or surface water intakes are currently known to exist within 15 miles downriver from the site (DOI 1994 and PRC 1995a).

4.3 SOIL EXPOSURE PATHWAY

Surface soil samples collected during the 1990 SSI indicate that elevated concentrations of organic compounds and metals exist in on-site surface soils (E&E 1991). The only apparent soil exposure pathway targets are recreational users. During the site reconnaissance conducted by PRC, several motorcycle trails were observed (see Photographs No. 7 and 8). Potential exposure to soil from this type of recreational use exists because motorcycle riding disturbs soils; therefore, contaminants in the soil could be ingested, inhaled, or absorbed through dermal contact.

The Philo Plant site is fenced except for the ash disposal area, but the site is easily accessible. No Ohio Power Company personnel work at the electrical substation. No workers are employed at the Philo Plant site, and no schools or residences are present within 200 feet of the site.

4.4 AIR MIGRATION PATHWAY

Although no releases of hazardous substances to the air pathway have been documented, this pathway presents a potential risk to recreational users of the Philo Plant site. As discussed in Section 4.3, the site is used for recreational motorcycle riding. There are 212 residents living within 1 mile of the Philo

Plant site. A potential exists for contaminated soil particulates to be inhaled by motorcyclists during summer dry periods.

5.0 SUMMARY

The Philo Plant site is an inactive, coal fired electrical power plant located on the Muskingum River immediately east of the Town of Philo. An SSI conducted by the EPA FIT on February 20 and 21, 1990, revealed contamination of on-site soils and sediments in the Muskingum River with organic compounds and metals. The site contains two primary sources of hazardous substances: an ash disposal area and the two surface impoundments. These sources can affect potential receptors through all four exposure pathways. The municipal drinking water wells for the towns of Philo and Duncan Falls are located within 0.5 mile of the Philo Plant site. Approximately 8,788 people receive their drinking water supplies from municipal and residential wells that are located within 4 miles of the site. Groundwater contamination under the Philo Plant site has not been documented, but the potential for contaminants to migrate to groundwater exists. PRC observed motorcycle trails at the site during the reconnaissance. This type of recreational use disturbs contaminated soils, allowing potential exposure to occur through dermal absorption, ingestion, and inhalation of soil particulates.

REFERENCES

Ecology and Environment, Inc. (E&E). 1991. Screening Site Inspection Report for the Ohio Power Company Philo Plant (Philo Plant), Site Conducted on February 20 and 21, 1990. Philo, Ohio. March 28.

Federal Emergency Management Agency (FEMA) 1988. Flood Insurance Rate Map for Unincorporated Areas in Muskingum County, Ohio. June 3.

Frost and Associates (Frost). 1995. CENTRACTS Report for the Philo Plant Site. January 20.

Ohio Department of Natural Resources (ODNR). 1995. Letter and Attachment Regarding Fish Catch Estimates for the Muskingum River. From Michael A. Greenlee, Aquatic Biologist, Division of Wildlife. To Dave Harr, PRC Environmental Management, Inc. (PRC). February 22.

Ohio Environmental Protection Agency (OEPA). 1981. Letter Regarding Status of Philo Plant Site National Pollutant Discharge Elimination System Permit. From Wayne S. Nichols, Regional Director. To Ohio Power Company. June 3.

OEPA. 1987. Preliminary Assessment of Philo Plant Site. September 23.

Ohio Power Company. 1975. News Release Regarding Closure of the Philo Plant Site. May 5.

PRC Environmental Management, Inc. (PRC). 1995a. Record of Telephone Conversation Regarding Drinking Water Intakes along the Muskingum River. Between David J. Harr, Paralegal, and Patricia Archer, ODNR, Muskingum River Parkway. February 14.

PRC. 1995b. Record of Telephone Conversation Regarding Recreational Use of Muskingum River. Between David J. Harr, Paralegal, and Mike Greenly, ODNR, Division of Wildlife. February 14.

PRC. 1995c. Logbook Notes for Philo Plant Site Reconnaissance. February 22.

PRC. 1995d. Record of Telephone Conversation Regarding Town of Philo and Municipal Water Supply. Between Jeff Leto, Environmental Scientist, and Superintendent of the Philo Water Department. March 2.

PRC. 1995e. Record of Telephone Conversation Regarding the Town of Duncan Falls and Municipal Water Supply. Between Jeff Leto, Environmental Scientist, and Superintendent of the East Muskingum Water Authority. March 2.

U.S. Department of the Interior (DOI). 1975. 7.5-Minute Quadrangle National Wetlands Inventory Map of Philo and Rokeby Lock, Ohio. March.

U.S. DOI. 1994. "1994 Federally Listed Endangered, Threatened, and Proposed Species; Ohio." April 1.

U.S. Geological Survey (USGS). 1975a. 7.5-Minute Series Topographic Map of Philo, Ohio, Quadrangle.

USGS. 1975b. 7.5-Minute Series Topographic Map of Zanesville East, Ohio, Quadrangle.

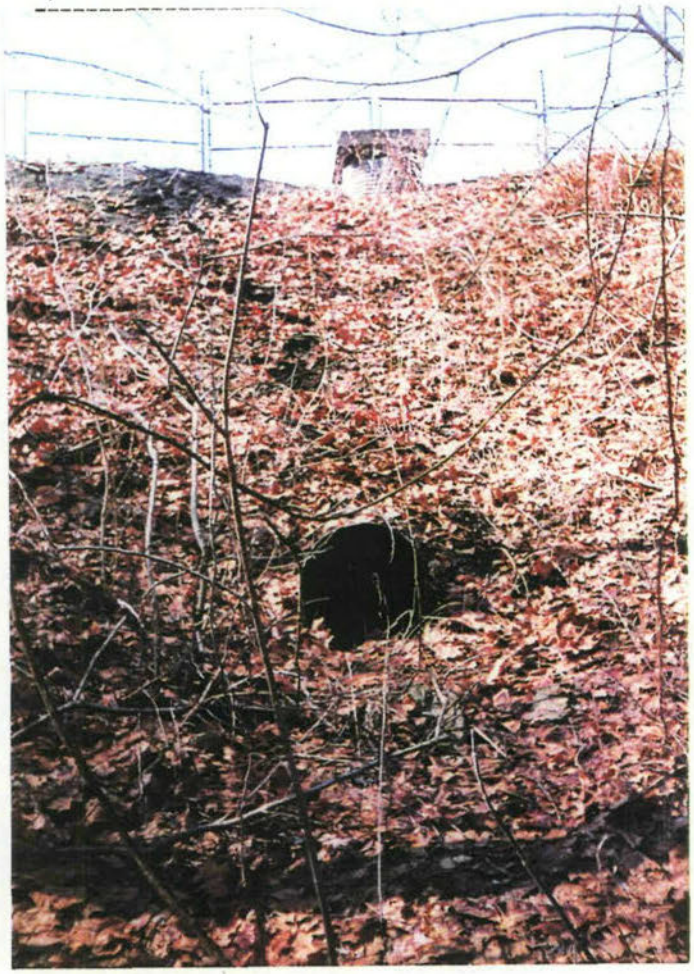
USGS. 1992. "Water Resources Data-Ohio, Volume 1, Ohio River Basin. 1991." March.

APPENDIX

SITE RECONNAISSANCE PHOTOGRAPHS

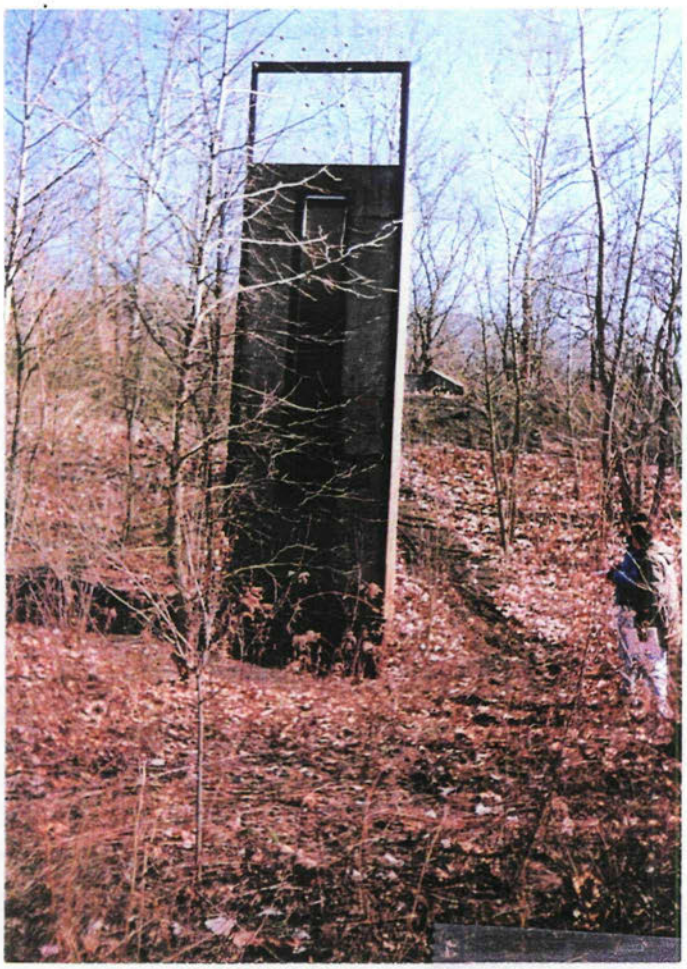
OHIO POWER COMPANY, PHILO PLANT
PHILO, OHIO

(Four Pages)



Photograph No. 1
Location: Ohio Power Company, Philo Plant (Philo Plant)
Orientation: West
Date: 02/22/95
Description: One of the two plant cooling water outfalls

Photograph No. 2 Location: Philo Plant
Orientation: South Date: 02/22/95
Description: South surface impoundment and backside of water level regulation tower



Photograph No. 3
Location: Philo Plant
Orientation: West
Date: 02/22/95
Description: North surface impoundment and front view of water level regulation tower

Photograph No. 4
Location: Philo Plant
Orientation: North
Date: 02/22/95
Description: Former location of Clearwater Pond

Photograph No. 5 — Location: Philo Plant
Orientation: North — Date: 02/22/95
Description: Former location of western coal pile

Photograph No. 6 — Location: Philo Plant
Orientation: North — Date: 02/22/95
Description: Former location of eastern coal pile; residual coal still visible on ground

Photograph No. 7 Location: Philo Plant
Orientation: West Date: 02/22/95
Description: Former location of northern surface impoundment showing motorcycle trails

Photograph No. 8 Location: Philo Plant
Orientation: West Date: 02/22/95
Description: Eastern portion of ash disposal area showing motorcycle trails

ATTACHMENT A

SITE INVESTIGATION SOIL AND SEDIMENT SAMPLING LOCATIONS AND ANALYTICAL RESULTS

OHIO POWER COMPANY, PHILO PLANT
PHILO, OHIO

(Four Pages)

TABLE A-1

SITE INVESTIGATION SOIL AND SEDIMENT SAMPLING ANALYTICAL RESULTS

Sample Collection Information and Parameters	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
	SOIL					SEDIMENT			BGD[a] SOIL	BGD SED
Date	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/21/90	2/21/90
Time	1415	1430	1430	1500	1550	1600	1615	1630	1620	1550
COMPOUND DETECTED (in µg/kg)[b,c,d]										
Volatile Organic Compound										
Methylene chloride	30[e]	240J	110J	41	170J	19	23	22	ND	ND
Carbon disulfide	2J	5J	2J	3J	3J	3J	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	4J	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	14J	ND	ND	ND	ND	ND
Semivolatile Organic Compound										
Naphthalene	130J	1,300	1,301	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	220J	1,900	154J	ND	ND	ND	ND	ND	ND	ND
Diethylphthalate	ND	ND	ND	ND	ND	230J	ND	ND	ND	ND
Phenanthrene	130J	980	110J	ND	ND	ND	100J	ND	ND	ND
Anthracene	ND	130J	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butylphthalate	97J	170J	ND	100J	ND	150J	130J	130J	ND	ND
Fluoranthene	ND	610J	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	ND	650J	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(a)anthracene	ND	460J	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	530J	ND	ND	ND	ND	ND	ND	ND	ND
Bis(2-ethylhexyl)phthalate	120J	270J	95J	ND	ND	290J	150J	ND	ND	ND
Benzo(b)fluoranthene	ND	400J	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(k)fluoranthene	ND	280J	ND	ND	ND	ND	ND	ND	ND	ND
Tentatively Identified Compound										
Dichlorodifluoroethane	100J	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE A-1 (Continued)

SITE INVESTIGATION SOIL AND SEDIMENT SAMPLING ANALYTICAL RESULTS

Sample Collection Information and Parameters	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
	SOIL					SEDIMENT			BGD[a] SOIL	BGD SED
Date	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/21/90	2/21/90
Time	1415	1430	1430	1500	1550	1600	1615	1630	1620	1550
ANALYTE DETECTED (values in mg/kg)[c,d,f]										
Aluminum	6,260	17,100	6,950	9,110	27,000	9,540	11,300	4,990	1,550	26,000
Antimony	ND	ND	ND	ND	ND	ND	ND	6.8J	ND	ND
Arsenic	12.4J	46.3J	7.4J	23.6J	81.2J	10.8J	14.3J	11.7J	8.4	29.6
Barium	46.8	238	41.38	97.8	143	120	128	61.8	142	4,160
Beryllium	2.5J	5.0	2.6J	2.9J	8.6	4.2	4.2	3.1J	1.6	5.8
Cadmium	1.7	3.7	1.6	1.18	2.3	2.2	ND	ND	5.2J	7.5J
Calcium	1,160	1,340B	596B	196JB	4,170	15,100	13,600	2,280	17,900	65,300
Chromium	20	50.8	16.3	20	44	23.8	25.4	13.3	32.23J	49.9J
Cobalt	6.0JB	23.1	5.3JB	8.2JB	16.2	22.3	21.3	12.4B	19.1	13.5B
Copper	26.2J	299J	13.8J	35.2J	39.4J	27.8J	26.7J	15.5J	45.8J	52.2J
Iron	23,000	74,800	19,7000	45,300	46,800	29,100	30,500	29,600	40,300	22,300
Lead	10.4	99.7	5.3	15.9	19.7	22.3	22.6	13.1	41.51	46.3J
Magnesium	539B	1,810	404B	1,840	1,460	3,280	3,360	1,180B	3,810	7,450
Manganese	75.5	1,540	26.9	178	359	1,660	1,590	954	955J	24,500J
Mercury	0.11	0.59	0.64	0.13	0.13	0.16	0.15	.013	ND	ND
Nickel	5.48	50.9	5.6B	17.4	37	42.2	41.1	23.7	39.4	30.8
Potassium	1,110	2,630	1,080	1,770	3,390	1,240B	1,610	680B	2,960	4,190
Selenium	ND	3.1	ND	0.608	ND	ND	ND	ND	0.65J	0.33J
Silver	2.1B	2.4B	2.1B	2.2B	1.9B	2.4B	1.9B	1.6B	ND	ND
Sodium	238B	342B	159B	145B	399B	130B	150B	104B	176B	677B
Thallium	1.8B	6.0	1.3B	2.0B	6.4	1.6B	1.9B	1.4B	ND	1.6J

TABLE A-1 (Continued)

SITE INVESTIGATION SOIL AND SEDIMENT SAMPLING ANALYTICAL RESULTS

Sample Collection Information and Parameters	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
	SOIL					SEDIMENT			BGD[a] SOIL	BGD SED
Date	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/20/90	2/21/90	2/21/90
Time	1415	1430	1430	1500	1550	1600	1615	1630	1620	1550
Vanadium	13.8	53.8	15.4	35.6	72.4	25.1	27.1	15	38.1J	16.6J
Zinc	26.6	285	20	82.7	107	174	171	89.9	115	185

Source: E&E 1991

Notes:

[a] BGD = Background

[b] µg/kg = Microgram per kilogram

[c] Compound Qualifier:

J Indicates an estimated value

Analyte Qualifier:

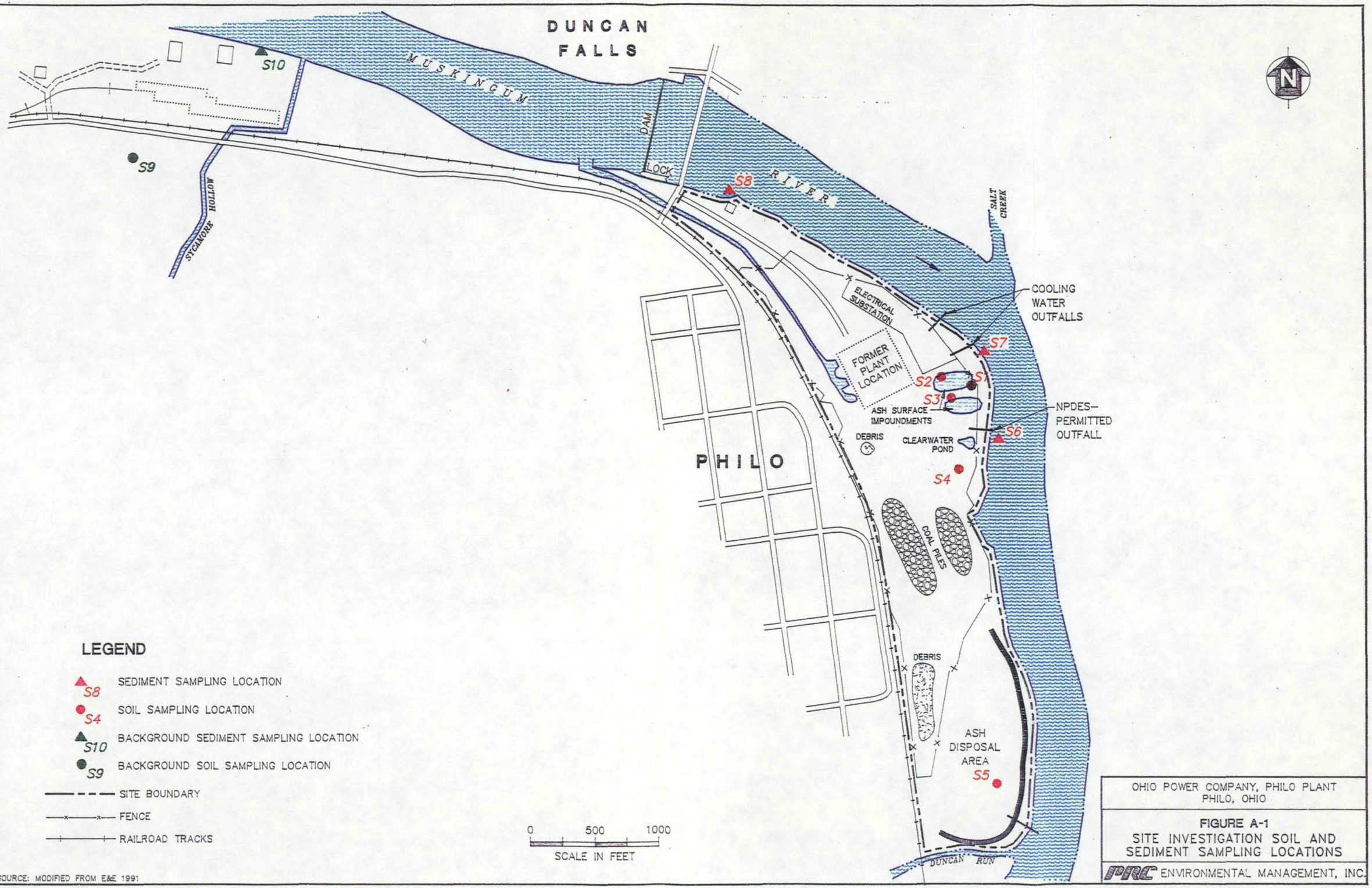
J Value is above contract-required detection limit and is an estimated value because of a quality control protocol

B Value is real but above instrument detection limit and below contract-required detection limit

[d] ND = Not detected

[e] Shaded value detected above contract-required detection limit (CRDL) and background value is not detected

[f] mg/kg = Milligram per kilogram



OHIO POWER COMPANY, PHILO PLANT
PHILO, OHIO

FIGURE A-1
SITE INVESTIGATION SOIL AND SEDIMENT SAMPLING LOCATIONS

PRC ENVIRONMENTAL MANAGEMENT, INC.

ATTACHMENT B

CONTRACT LABORATORY PROGRAM
CONTRACT-REQUIRED DETECTION LIMITS

(Five Sheets)

Contract Laboratory Program
Target Compound List
Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SEDIMENT SLUDGE
Chloromethane	74-87-3	10 ug/L	10 ug/Kg
Bromomethane	74-83-9	10	10
Vinyl chloride	75-01-4	10	10
Chloroethane	75-00-3	10	10
Methylene chloride	75-09-2	5	5
Acetone	67-64-1	10	5
Carbon disulfide	75-15-0	5	5
1,1-dichloroethene	75-35-4	5	5
1,1-dichloroethane	75-34-3	5	5
1,2-dichloroethene (total)	540-59-0	5	5
Chloroform	67-66-3	5	5
1,2-dichloroethane	107-06-2	5	5
2-butanone (MEK)	78-93-3	10	10
1,1,1-trichloroethane	71-55-6	5	5
Carbon tetrachloride	56-23-5	5	5
Vinyl acetate	108-05-4	10	10
Bromodichloromethane	75-27-4	5	5
1,2-dichloropropane	78-87-5	5	5
cis-1,3-dichloropropene	10061-01-5	5	5
Trichloroethene	79-01-6	5	5
Dibromochloromethane	124-48-1	5	5
1,1,2-trichloroethane	79-00-5	5	5
Benzene	71-43-2	5	5
Trans-1,3-dichloropropene	10061-02-6	5	5
Bromoform	75-25-2	5	5
4-Methyl-2-pentanone	108-10-1	10	10
2-Hexanone	591-78-6	10	10
Tetrachloroethene	127-18-4	5	5
Tolene	108-88-3	5	5
1,1,2,2-tetrachloroethane	79-34-5	5	5
Chlorobenzene	108-90-7	5	5
Ethyl benzene	100-41-4	5	5
Styrene	100-42-5	5	5
Xylenes (total)	1330-20-7	5	5

Contract Laboratory Program
Target Compound List
Semivolatiles Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SEDIMENT SLUDGE
Phenol	108-95-2	10 ug/L	330 ug/Kg
bis(2-Chloroethyl) ether	111-44-4	10	330
2-Chlorophenol	95-57-8	10	330
1,3-Dichlorobenzene	541-73-1	10	330
1,4-Dichlorobenzene	106-46-7	10	330
Benzyl Alcohol	100-51-6	10	330
1,2-Dichlorobenzene	95-50-1	10	330
2-Methylphenol	95-48-7	10	330
bis(2-Chloroisopropyl) ether	108-60-1	10	330
4-Methylphenol	106-44-5	10	330
N-Nitroso-di-n-dipropylamine	621-64-7	10	330
Hexachloroethane	67-72-1	10	330
Nitrobenzene	98-95-3	10	330
Isophorone	78-59-1	10	330
2-Nitrophenol	88-75-5	10	330
2,4-Dimethylphenol	105-67-9	10	330
Benzoic Acid	65-85-0	50	1600
bis(2-Chloroethoxy) methane	111-91-1	10	330
2,4-Dichlorophenol	120-83-2	10	330
1,2,4-Trichlorobenzene	120-82-1	10	330
Naphthalene	91-20-3	10	330
4-Chloroaniline	106-47-8	10	330
Hexachlorobutadiene	87-68-3	10	300
4-Chloro-3-methylphenol	59-50-7	10	330
2-Methylnaphthalene	91-57-6	10	330
Hexachlorocyclopentadiene	77-47-4	10	330
2,4,6-Trichlorophenol	88-06-2	10	330
2,4,5-Trichlorophenol	95-95-4	50	1600
2-Chloronaphthalene	91-58-7	10	330
2-Nitroaniline	88-74-4	50	1600
Dimethylphthalate	131-11-3	10	330
Acenaphthylene	208-96-8	10	330
2,6-Dinitrotoluene	606-20-2	10	330
3-Nitroaniline	99-09-2	50	1600
Acenaphthene	83-32-9	10	330
2,4-Dinitrophenol	51-28-5	50	1600
4-Nitrophenol	100-02-7	50	1600
Dibenzofuran	132-64-9	10	330
2,4-Dinitrotoluene	121-14-2	10	330
Diethylphthalate	84-66-2	10	330
4-Chlorophenyl-phenyl ether	7005-72-3	10	330

Contract Laboratory Program
Target Compound List
Semivolatiles Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SLUDGE SEDIMENT
Fluorene	86-73-7	10 ug/L	330 ug/Kg
4-Nitroaniline	100-01-6	50	1600
4,6-Dinitro-2-methylphenol	534-52-1	50	1600
N-nitrosodiphenylamine	86-30-6	10	330
4-Bromophenyl-phenylether	101-55-3	10	330
Hexachlorobenzene	118-74-1	10	330
Pentachlorophenol	87-86-5	50	1600
Phenanthrene	85-01-8	10	330
Anthracene	120-12-7	10	330
Di-n-butylphthalate	84-74-2	10	330
Fluoranthene	206-44-0	10	330
Pyrene	129-00-0	10	330
Butylbenzylphthalate	85-68-7	10	330
3,3'-Dichlorobenzidine	91-94-1	20	660
Benzo(a)anthracene	56-55-3	10	330
Chrysene	218-01-9	10	330
bis(2-Ethylhexyl)phthalate	117-81-7	10	330
Di-n-octylphthalate	117-84-0	10	330
Benzo(b)fluoranthene	205-99-2	10	330
Benzo(k)fluoranthene	207-08-9	10	330
Benzo(a)pyrene	50-32-8	10	330
Indeno(1,2,3-cd)pyrene	193-39-5	10	330
Dibenz(a,h)anthracene	53-70-3	10	330
Benzo(g,h,i)perylene	191-24-2	10	330

Contract Laboratory Program
Target Compound List
Pesticide and PCB Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SEDIMENT SLUDGE
alpha-BHC	319-84-6	0.05 ug/L	8 ug/Kg
beta-BHC	319-85-7	0.05	8
delta-BHC	319-86-8	0.05	8
gamma-BHC (Lindane)	58-89-9	0.05	8
Heptachlor	76-44-8	0.05	8
Aldrin	309-00-2	0.05	8
Heptachlor epoxide	1024-57-3	0.05	8
Endosulfan I	959-98-8	0.05	8
Dieldrin	60-57-1	0.10	16
4,4'-DDE	72-55-9	0.10	16
Endrin	72-20-8	0.10	16
Endosulfan II	33213-65-9	0.10	16
4,4'-DDD	72-54-8	0.10	16
Endosulfan sulfate	1031-07-8	0.10	16
4,4'-DDT	50-29-3	0.10	16
Methoxychlor (Mariate)	72-43-5	0.5	80
Endrin ketone	53494-70-5	0.10	16
alpha-Chlordane	5103-71-9	0.5	80
gamma-chlordane	5103-74-2	0.5	80
Toxaphene	8001-35-2	1.0	160
AROCLOR-1016	12674-11-2	0.5	80
AROCLOR-1221	11104-28-2	0.5	80
AROCLOR-1232	11141-16-5	0.5	80
AROCLOR-1242	53469-21-9	0.5	80
AROCLOR-1248	12672-29-6	0.5	80
AROCLOR-1254	11097-69-1	1.0	160
AROCLOR-1260	11096-82-5	1.0	160

CONTRACT LABORATORY PROGRAM

TARGET ANALYTE LIST (TAL)

INORGANIC DETECTION LIMITS

Compound	Procedure	Detection Limits	
		Water (µg/L)	Soil Sediment Sludge (mg/kg)
aluminum	ICP	200	40
antimony	furnace	60	2.4
arsenic	furnace	10	2
barium	ICP	200	40
beryllium	ICP	5	1
cadmium	ICP	5	1
calcium	ICP	5,000	1,000
chromium	ICP	10	2
cobalt	ICP	50	10
copper	ICP	25	5
iron	ICP	100	20
lead	furnace	5	1
magnesium	ICP	5,000	1,000
manganese	ICP	15	3
mercury	cold vapor	0.2	0.008
nickel	ICP	40	8
potassium	ICP	5,000	1,000
selenium	furnace	5	1
silver	ICP	10	2
sodium	ICP	5,000	1,000
thallium	furnace	10	2
tin	ICP	40	8
vanadium	ICP	50	10
zinc	ICP	20	4
cyanide	color	10	2

ATTACHMENT C

AREA WELL LOGS

OHIO POWER COMPANY, PHILO PLANT
PHILO, OHIO

(Eleven Sheets)

WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL OR TYPEWRITER DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

No 295303

County Washington Township Harrison Section of Township

Owner Ohio Power Address Philo Ohio

Location of property Philo Ohio

CONSTRUCTION DETAILS

Casing diameter 38" : 6 Length of casing 55'0

Type of screen Louvre Length of screen 10'0

Type of pump ?

Capacity of pump 400 G.P.M.

Depth of pump setting ?

Date of completion 5-1-63

BAILING OR PUMPING TEST

Pumping Rate 400 G.P.M. Duration of test 8 hrs.

Drawdown 16'0 ft. Date 5-1-63

Static level-depth to water 38'-0 ft.

Quality (clear, ~~cloudy, taste, odor~~)

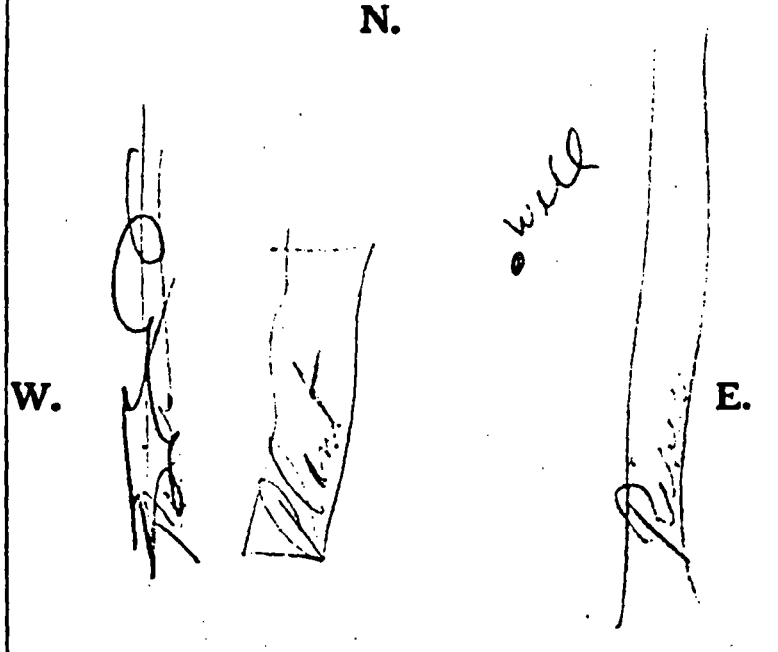
Pump installed by ?

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Top soil	0 Feet	5 Ft.
Cinders	5'0	15'0
Sand & Gravel	15'0	20'0
Yellow clay	20'0	40'0
Yellow Sand	40'0	55'0
Yellow Sand &	55'0	65'0
clay	65'0	66'0

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Jones Oil Co

Address R.D. ?

Date 6-4-63

Signed [signature]

WEL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

445147

County Muskingum Township Harrison Section of Township

Owner NON RESPONSIVE Address NON RESPONSIVE

Location of property NON RESPONSIVE

CONSTRUCTION DETAILS

asing diameter 7" Length of casing 37'

ype of screen Length of screen

ype of pump

apacity of pump

epth of pump setting

ate of completion July 20, 1973

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 4 G.P.M. Duration of test 6 hrs

Drawdown 160 ft. Date

Static level-depth to water 255 ft.

Quality (clear, cloudy, taste, odor) Clear

Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
op Soil	0 Feet	3 Ft.
rown Clay	3	12
ray Clay	12	18
ray Shale	18	22
ray Sandy Shale	22	31
ray Sand Rock	31	37
ray Sandy Shale	37	57
ed Sahle	67	62
rown Sandy Shale	62	68
owing of Gas	62	68
ray Sandy Shale	68	73
rown Sandy Shale	73	84
ray Sandy Shale	84	92

NON RESPONSIVE

Drilling Firm Suburban Drilling Company Date July 25, 1973

Address 1950 East Pike, Zanesville, O. Signed B. W. White

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2046
Columbus, Ohio 43215

445148
Page 2

County Muskingum Township Harrison Section of Township

Owner NON RESPONSIVE [redacted] Address NON RESPONSIVE [redacted]

Location of property [redacted] NON RESPONSIVE [redacted]

CONSTRUCTION DETAILS

asing diameter Length of casing
ype of screen Length of screen
ype of pump
apacity of pump
epth of pump setting
ate of completion

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate G.P.M. Duration of test hrs
Drawdown ft. Date
Static level-depth to water ft.
Quality (clear, cloudy, taste, odor)

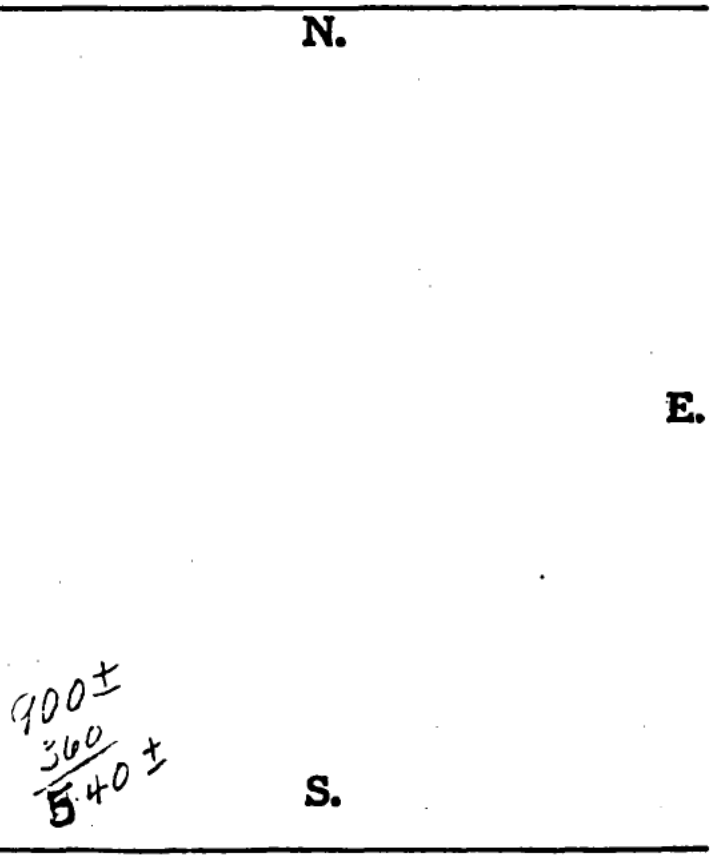
Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From 0 Feet	To Ft.
ray Sandy Shale	92	106
ray Sand Rock	106	122
hite Sand Rock	122	202
Gray Shale	202	217
ray Sandy Shale	217	225
ray Shal4	225	236
ray Sandy Shale	236	290
ray Lime Stone	290	296
ray Sandy Phale	296	318
hite Sand Rock	318	360
ater	348	

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm Suburban Wlrs.
Address Zanesville

Date 7-25-73
Signed

PLEASE USE PENCIL
OR TYPEWRITER
DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus 12, Ohio

No 318886

County Muskingum Township Harrison Section of Township

NON RESPONSIVE

CONSTRUCTION DETAILS

Casing diameter 6 5/8 Length of casing 19'-4"
Type of screen None Length of screen
Type of pump None Set
Capacity of pump
Depth of pump setting
Date of completion

BAILING OR PUMPING TEST

Pumping Rate 2 G.P.M. Duration of test 2 hrs.
Drawdown 114 ft. Date Dec 12-64
Static level-depth to water 74 ft.
Quality (clear, cloudy, taste, odor) Cloudy
Pump installed by

WELL LOG

Formations Sandstone, shale, limestone, gravel and clay	From	To
Brown Shale	0 Feet	3 Ft.
Red Clay	3	7
Red Rock	7	18
Limestone	18	67
Gray Shale	67	75
Soft Gray Shale	75	82
Coal	82	85
Sand Rock	85	87
Gray Sandy Shale	87	99
Red Rock	99	106
Gray Sandy Shale	106	114
Water at	98	
Total Depth	114	

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N

NON RESPONSIVE

Drilling Firm Anderson Water Dr. Co
Address Rt. #2 Willow Dr. Zanesville O

Date Dec 12-1964
Signed Robert Anderson

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

464031

County Muskingum Township ~~Franklin~~ Harrison Section of Township

Owner NON RESPONSIVE Address NON RESPONSIVE

Location of property NON RESPONSIVE

CONSTRUCTION DETAILS

Casing diameter 6 5/8 Length of casing 17

Type of screen Length of screen

Type of pump Jet

Capacity of pump

Depth of pump setting

Date of completion

BAILING OR PUMPING TEST
(Specify one by circling)

Test Rate 2 G.P.M. Duration of test hrs.

Drawdown ft. Date

Static level-depth to water 18 ft.

Quality (clear, cloudy, taste, odor)

Pump installed by Owner

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Surface	0 Feet	3 Ft.
Sand	3	15
Sandstone	15	37
Water 27 ft.		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.

N.

NON RESPONSIVE

W

Drilling Firm Swingle Water Well Drilling Date 5-14-74

Address Route 7, Zanesville, Ohio 43701 Signed Jack Swingle

*If additional space is needed to complete well log, use next consecutive numbered form.

County Permit No.

NO CARBON PAPER NECESSARY– SELF-TRANSCRIBING

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
Fountain Square
Columbus, Ohio 43224

ORIGINAL

536130

COUNTY Hocking TOWNSHIP Harrison SECTION OF TOWNSHIP

OWNER NON RESPONSIVE ADDRESS NON RESPONSIVE

LOCATION OF PROPERTY NON RESPONSIVE

CONSTRUCTION DETAILS

ing diameter 6 5/8 OD Length of casing 46

e of screen Length of screen

e of pump

acity of pump

th of pump setting

of completion

BAILING OR PUMPING TEST
(specify one by circling)

Test rate 20 gpm Duration of test 2 hrs

Drawdown 29 ft Date

Static level (depth to water) 25 ft

Quality (clear, cloudy, taste, odor) Clear

Pump installed by None Set

WELL LOG*

Formations: sandstone, shale, limestone, gravel, clay	From	To
Brown Shale	0 ft	3 ft
Clay	3	7
Fine Sand	7	24
Sand & Gravel	24	44
Water at	43	
Total Depth	44	

SKETCH SHOWING LOCATION

Locate in reference to numbered state highways, street intersections, county roads, etc.

NON RESPONSIVE

DRILLING FIRM Anderson Drlg

ADDRESS 113 S. Willow Dr. Zanesville

DATE Aug 11 79

SIGNED Robert Anderson

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

462146

County Muskingum Township Harrison Section of Township

Owner Muskingum River Park Area Address P.O. Box 2806; Zanes., Oh. 43701

Location of property Philo Locktender's House, Philo, Ohio 43771

CONSTRUCTION DETAILS

sing diameter 6-5/8" Length of casing 34'
pe of screen Slots Length of screen 2'
pe of pump
pacity of pump
pth of pump setting
te of completion 11/6/75

BAILING OR PUMPING TEST
(Specify one by circling)

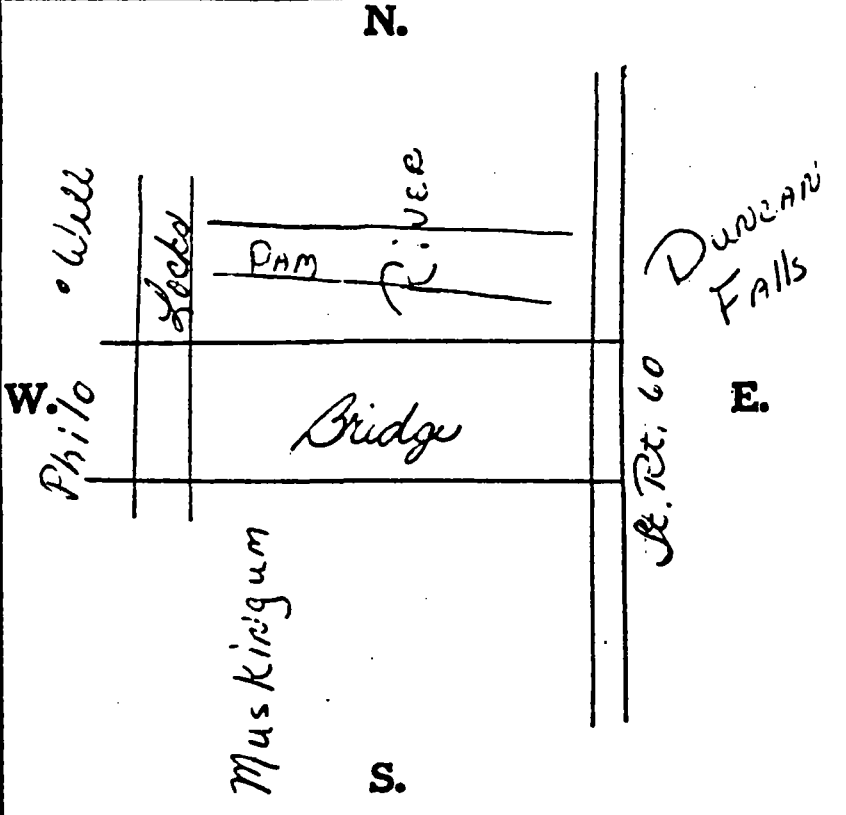
Test Rate 2 G.P.M. Duration of test 2 hrs.
Drawdown 73 ft. Date 11/3/75
Static level-depth to water 21' ft.
Quality (clear, cloudy, taste, odor) Clear
Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Top	0 Feet	3 Ft.
Brown Clay	3	7
Brown Sand	7	17
Brown Sand & Sm. Gravel	17	22
Brown Sand	22	27
Gray Shale	27	33
Gray Sandy Shale	33	56
Gray Shale	56	65
Coal Blossom	65	69
Showing of Coal	69	71
Gray Shale	71	75 TD
1 GPM at 28'		
1 GPM at 61'		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm Suburban Drilling Co., Inc. Date November 14, 1975

Address 1950 East Pike
Zanesville, Ohio 43701

Signed Bill H. White
(TF)

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

462148

County Muskingum Township Harrison Section of Township

Owner Philo Water Works Address P.O. Box 134 Philo, Ohio 43771

Location of property 1 Mile South of Philo on Co. Rd. #6

CONSTRUCTION DETAILS

Casing diameter 10' Length of casing 30'
Type of screen Stainless Length of screen 20'
Type of pump
Capacity of pump
Depth of pump setting
Date of completion 11/10/75

BAILING OR PUMPING TEST
(Specify one by circling)

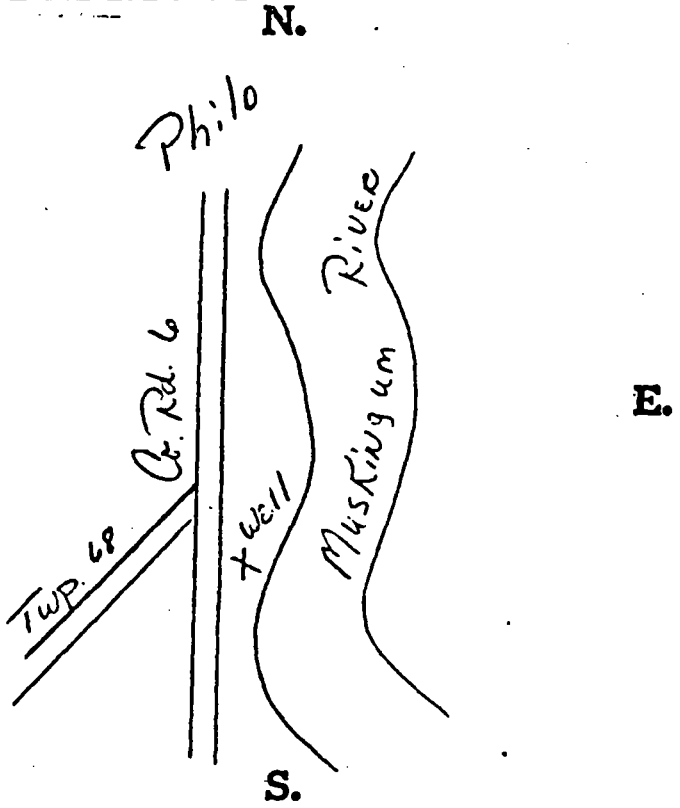
Test Rate 500 + G.P.M. Duration of test hrs.
Drawdown NBD ft. Date 11/7/75
Static level-depth to water 10' ft.
Quality (clear, cloudy, taste, odor) Clear
Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
	0 Feet	6 Ft.
Top		
Brown Clay	6	12
Brown Silt	12	18
Brown Sant & Sm. Grave	18	23
Brown Sand	23	31
Gray Sand & Water	31	50
Gray Shale	50	51
Water at 18'		
Water at 35'		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm Suburban Drilling Co., Inc. Date December 16, 1975

Address 1950 East Pike
Zanesville, Ohio 43701

Signed Bill White
(ek)

*If additional space is needed to complete well log, use next consecutive numbered form.

WELL LOG AND DRILLING REPORT

ORIGINAL

PLEASE USE PENCIL OR TYPEWRITER

DO NOT USE INK.

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

No 352615

County Muskingum Township WAYNE Section of Township 30

Owner Dutch's Ass., Inc Address Duncan Falls, Ohio

Location of property On South side of East Roemer Street in Duncan Falls, Ohio

CONSTRUCTION DETAILS

Casing diameter 12½" Length of casing 98'6"

Type of screen Johnson Length of screen 10'

Type of pump Turbine

Capacity of pump 200 GPM @ 183'

Depth of pump setting 91'

Date of completion 9-3-66

BAILING OR PUMPING TEST

Pumping Rate 200 G.P.M. Duration of test 24 hrs.

Drawdown 4½'-5' ft. Date 9-2-66

Static level-depth to water 65' ft.

Quality (clear, cloudy, taste, odor) clear no odor

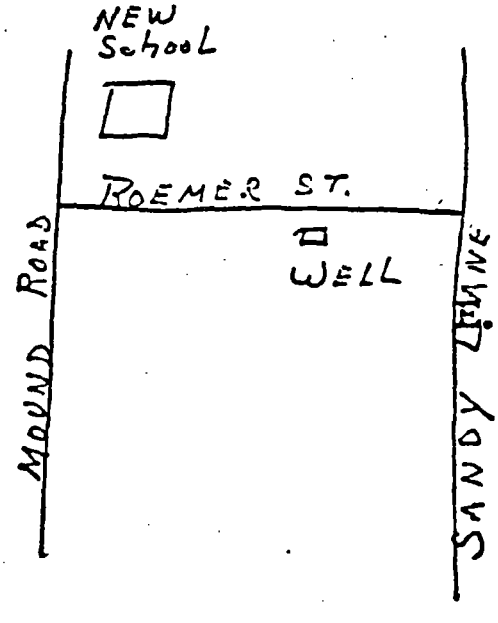
Pump installed by Driller

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Sand & Gravel	0 Feet	105 Ft.
water at 65'		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm R.C. Ramsey Date 9-5-66

Address RR 6 Zanesville, O. Signed R C Ramsey

*If additional space is needed to complete well log, use next consecutive numbered form.

Muskingum

WELL LOG AND DRILLING REPORT

NO. 295303

County MUSKINGUM Township HARRISON Section of Township

Owner OHIO POWER Address PHILO, OHIO

Location of property PHILO, OHIO

CONSTRUCTION DETAILS

Casing diameter 38 x 26 Length of casing 55

Type of screen Layre Length of screen 10

Type of pump

Capacity of pump 400 gpm

Depth of pump setting

Date of completion 5-1-63

BAILING OR PUMPING TEST

Pumping rate 400 G.P.M.

Duration of test 8 Hrs.

Drawdown 16 ft. Date 5-1-63

Static level - depth to water 38 Ft.

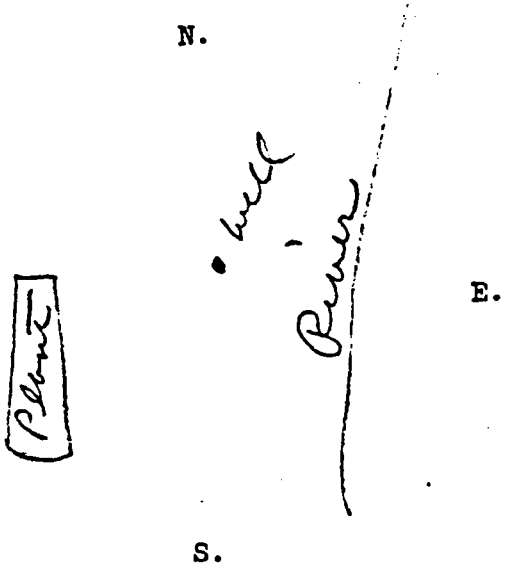
Quality

Pump installed by

WELL LOG

Formation	From	To
Top soil	0	5
Cinders	5	15
Sand & gravel	15	20
Yellow clay	20	40
Yellow sand	40	55
Yellow S & G	55	65
Clay	65	66

SKETCH SHOWING LOCATION



Drilling Firm Layne Ohio Date 6-4-63

Address Columbus, O. Copied by RH (6/7/63)

WELL LOG AND DRILLING REPO

Municipal ORIGINAL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

No. 350851

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

County Muskingum Township Blue Rock Section of Township

Owner Corp.of Philo Address Philo, Ohio

Location of property Philo, Ohio

CONSTRUCTION DETAILS

Casing diameter 5" Length of casing 49'
Type of screen Length of screen
Type of pump
Capacity of pump
Depth of pump setting
Date of completion June 11, 1966

BAILING OR PUMPING TEST

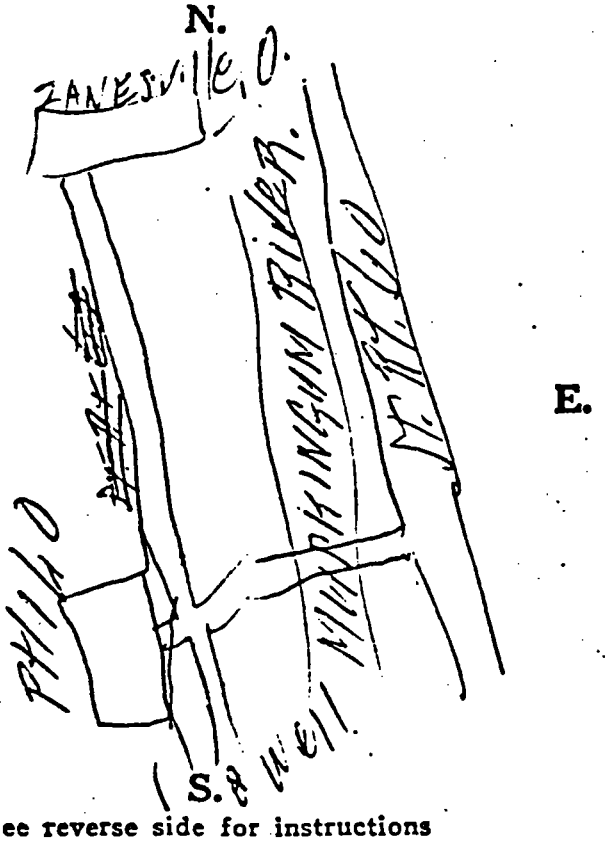
Pumping Rate 30 G.P.M. Duration of test hrs.
Drawdown 18 ft. Date June 11, 1966
Static level-depth to water 8 ft.
Quality (clear, cloudy, taste, odor) Clear
Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Top	0 Feet	5 Ft.
Sand, Silty	5	17
Brown Sand	17	32
Brown Sand & Gravel	32	40
Gray Sand & Gravel-		
Broken Sand Rock	40	45
Fine Gray Sand & Gravel	45	48
Gray Sandy Broken Sand Rock	48	49
Fire Clay	49	51
(Water @ 10'-Test Well)		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Suburban Drilling Co. Date June 14, 1966

Address 1950 E. Pike, Zanesville, Ohio Signed B. H. White

Industrial

LOCATED

WELL LOG AND DRILLING REPORT

NO. 119521

County Muskingum Township Harrison Section of Township

Owner Ohio Power Co. Address Philo, Ohio

Location of property Philo, Ohio

CONSTRUCTION DETAILS

Casing diameter 13" Length of casing 52'

Type of screen Brass Length of screen 15'

Type of pump Turbine

Capacity of pump 300 GPM at 220

Depth of pump setting 61'

Date of completion

BAILING OR PUMPING TEST

Pumping rate 300 G.P.M.

Duration of test 10 Hrs.

Drawdown 5 ft. Date 12-13-55

Developed capacity 600 GPM at 19'DD

Static level - depth to water 40'6" Ft.

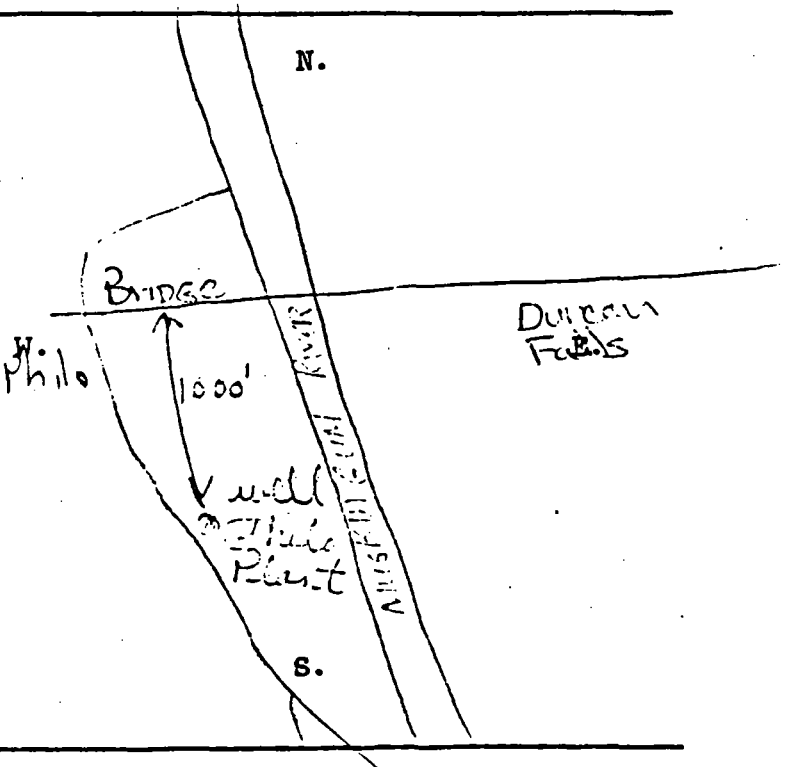
Pump installed by Ohio Power Co.

WELL LOG

Formation	From	To
Top Filled Soil	0	3
Filled cinders Original top soil before cinder fill	3	28
Sand & Gravel	28	65
Blue Shale	65	67

Well to be tested to 300 GPM for 10 yrs. when Ohio Power installs pump.

SKETCH SHOWING LOCATION



Drilling Firm M.L.Dutro Date Nov.2,1955

Address 144 1/2 S. 6th. St. Zanesville, Ohio Copied by j.c.

WELL [L]G AND DRILLING REPO[RT]

ORIGINAL

Municipal

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

No 360970

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

County Muskingum Township Harrison Section of Township

Owner Village of Philo, Address Philo, Ohio

Location of property ¼ Mile South of Philo, on Co. Rd. 6

CONSTRUCTION DETAILS

[C]asing diameter 10" Length of casing 42'

[T]ype of screen Slots Length of screen 5'

[T]ype of pump

[C]apacity of pump

[D]epth of pump setting

[D]ate of completion June 24, 1967

BAILING OR PUMPING TEST

Bailed @ Pumping Rate 60 G.P.M. Duration of test hrs.

Drawdown 7 ft. Date

Static level-depth to water 11 ft.

Quality (clear, cloudy, taste, odor) Clear

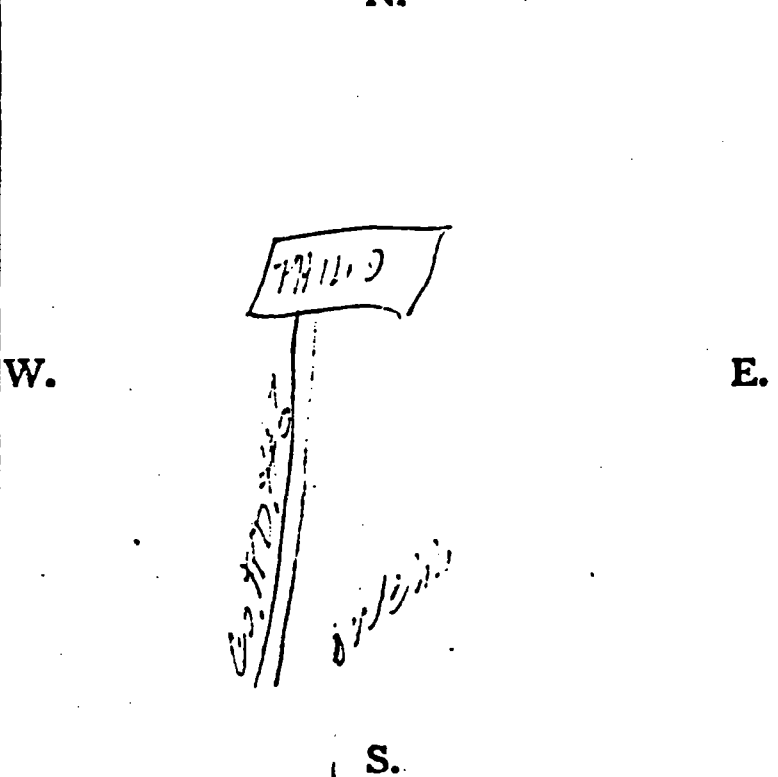
Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
[S]nd & Gravel	0 Feet	36Ft.
3 Ft. Bridge in Bottom		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Suburban Drilling Co. Date June 26, 1967

Address 1950 E. Pike, Zanesville, Ohio Signed B. H. White

*If additional space is needed to complete well log, use next consecutive numbered form.

Municipal

15-20 LOCATED

WL 6

WELL LOG AND DRILLING REPORT

NO. 96560

County Muskingum Township Harrison Section of Township 31

Owner Philo Village Corp. Address Philo, Ohio

Location of property 400' S. of Philo Corp. limits near Co. Rd. #6

CONSTRUCTION DETAILS

Casing diameter 10" Length of casing 70'

Type of screen Johnson 60 slot Length of screen 10'

Type of pump Deming Turbine

Capacity of pump 50 GPM

Depth of pump setting 70'

Date of completion

BAILING OR PUMPING TEST

Pumping rate 75 G.P.M.

Duration of test 38 1/2 Hrs.

Drawdown 17 ft. Date

Developed capacity 75 GPM

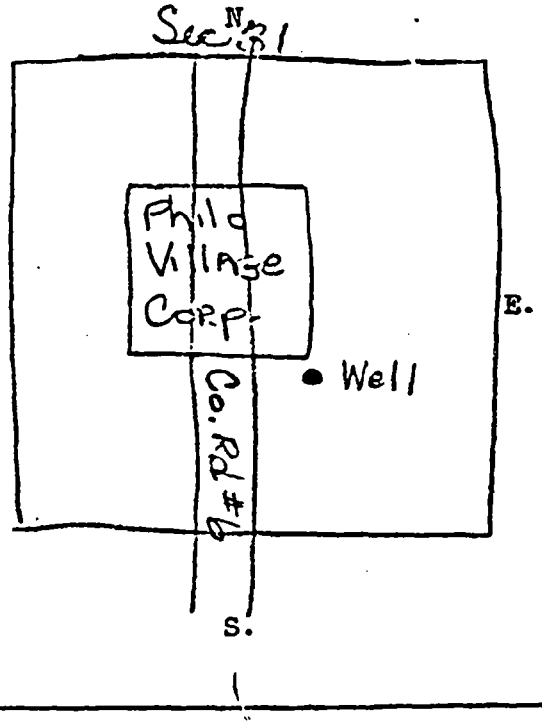
Static level - depth to water 52 Ft.

Pump installed by

WELL LOG

Formation	From	To
Fine Sand & Loam	0	47
Sand & Fine Gravel	47	50
Fine Sand	50	65
Sand & Fine Gravel	65	80
Total depth 80'		

SKETCH SHOWING LOCATION



Drilling Firm S.M. Ebersbach Date July 18, 1952

Address 2195 East Pike Zanesville, Ohio Copied by j.c.

ORIGINAL

WELL LOG AND DRILLING REPORT

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue,
Columbus, Ohio 43212

Municipal No. 350882

LEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

County Muskingum Township Harrison Section of Township

Owner Corp. of Philo Address Philo, Ohio

Location of property 1 Mile South of Philo, Ohio- Co. Rd. 79

CONSTRUCTION DETAILS

asing diameter 10" / Length of casing 41'

ype of screen 1/8" Slot Length of screen 5'

ype of pump

apacity of pump

epth of pump setting

ate of completion July 30, 1966

BAILING OR PUMPING TEST

Pumping Rate 140 G.P.M. Duration of test 4 hrs.

Drawdown 9 ft. Date July 29, 1966

Static level-depth to water 0 ft.

Quality (clear, cloudy, taste, odor) Clear

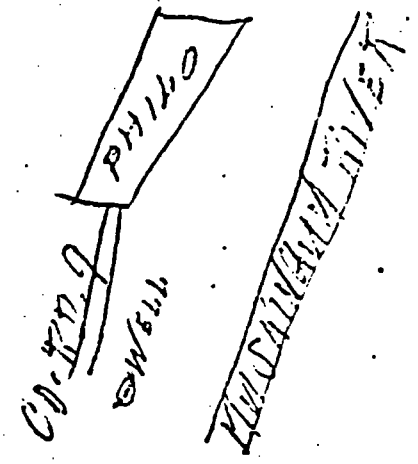
Pump installed by

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Sand & Gravel	0 Feet	40Ft.
(Water at 10 Ft.)		

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm Suburban Drilling Co. Date Nov. 1, 1966

Address 1950 E. Pike, Zanesville, Ohio Signed B. H. White

*If additional space is needed to complete well log, use next consecutive numbered form.

Municipal

LOCATED

WELL LOG AND DRILLING REPORT

NO. 94539

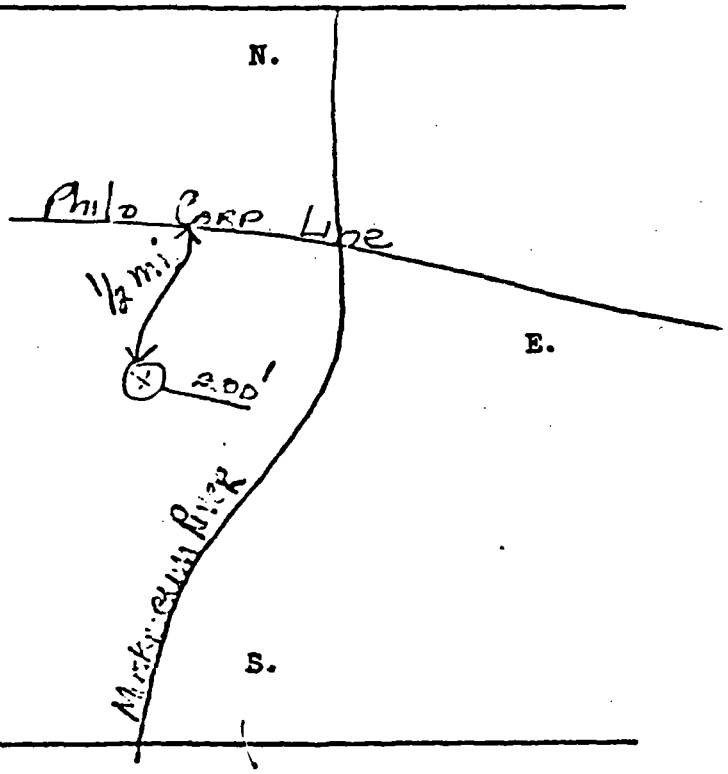
County Muskingum Township Harrison Section of Township

Owner Village of Philo, Ohio Address Water Works

Location of property 1/ 2mi. S. of Philo Corp. line

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter 10" Length of casing 53'	Pumping rate 194 G.P.M.
Type of screen Everd Length of screen 8'	Duration of test 14 Hrs.
Type of pump Turbine	Drawdown 8 ft. Date
Capacity of pump 150 GPM at 300' head	Developed capacity 200 GPM
Depth of pump setting 50'	Static level - depth to water 26 Ft.
Date of completion	Pump installed by ML Dutro

WELL LOG			SKETCH SHOWING LOCATION
Formation	From	To	
Top Soil	0	10	
Sand	10	61	



Drilling Firm M.L. Dutro Date July 22, 1953

Address 144 1/2 S. 6th. Copied by j.c.

WELL LOG AND DRILLING REPORT

ORIGINAL

WL

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1562 W. First Avenue
Columbus, Ohio 43212

PLEASE USE PENCIL OR TYPEWRITER
DO NOT USE INK.

No 345935

Designated #7 well

County Muskingum Township Jackson Section of Township

Owner Ohio Ferro-Alloys Corp. Address Philo Ohio

Location of property 60 Ft West of Muskingum River & 1½ Mi South of R. 555

CONSTRUCTION DETAILS

Casing diameter 24"x16" Length of casing 41'9"
Type of screen Bronze Length of screen 20'
Type of pump Deep Well Turbine
Capacity of pump Test
Depth of pump setting 52 Ft
Date of completion Nov. 12 - 1948

BAILING OR PUMPING TEST

Pumping Rate 800 G.P.M. Duration of test 8½ hrs.
Drawdown 12 ft. Date Nov. 12 - 1948
Static level-depth to water 12 ft.
Quality (clear, cloudy, taste, odor)

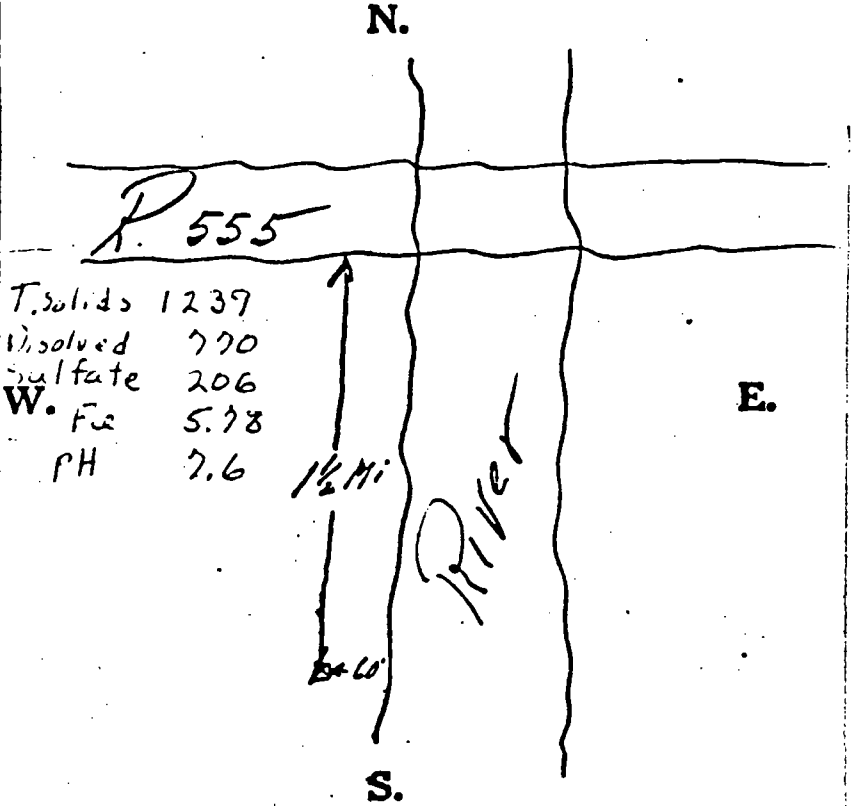
Pump installed by Bob Harrold

WELL LOG*

Formations Sandstone, shale, limestone, gravel and clay	From	To
Clay & Stones	0 Feet	18 Ft.
Gravel & Sand	18	27
Sand & Gravel	27	36
Sand	36	45
Sand & Gravel	45	47
Sand	47	50
Sand & Gravel	50	67

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



See reverse side for instructions

Drilling Firm The Ohio Drilling Co. Date JAN 10 - 1949

Address Massillon Ohio Signed [signature]

If additional space is needed to complete well log, use next consecutive numbered form.

17-
LOCATED

WELL LOG AND DRILLING REPORT

NO. 193903

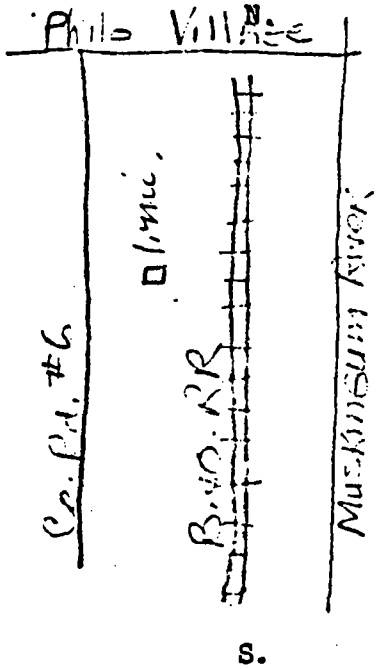
County Muskingum Township Harrison Section of Township 5

Owner Philo Village Address Philo, Ohio

Location of property On E. side of Co. Rd. #6 approx. 1 mi. S. of Philo, O.

CONSTRUCTION DETAILS	BAILING OR PUMPING TEST
Casing diameter 10" Length of casing 54	Pumping rate 225 G.P.M.
Type of screen Johnson WW Length of screen 8'	Duration of test 26 hrs.
Type of pump Turbine	Drawdown 13 ft. Date 3-19-57
Capacity of pump 150 GPM at 315' Head	Developed capacity 225 GPM by pump
Depth of pump setting 49'	Static level - depth to water 25 ft.
Date of completion 3-15-57	Pump installed by Driller to test well and removed.

WELL LOG			SKETCH SHOWING LOCATION
Formation	From	To	
Sandy Loam	0	5	
Brown Sand & Gravel	5	52	
Gray Sand & Gravel	52	60	
Water after 26'			



Drilling Firm R.C. Ramsey Date 3-30-57

Address Rt. 6 Zanesville, Ohio Copied by j.c.

WELL LOG AND DRILLING REPORT

ORIGINAL

NO CARBON PAPER NECESSARY— SELF-TRANSCRIBING

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
65 S. Front St., Rm. 815 Phone (614) 469-2646
Columbus, Ohio 43215

No. 401673
Designated #8 well

County Muskingum Township Harrison Section of Township 2

Owner Ohio Ferro Alloys Corp Address [illegible]

Location of property 50' West of Muskingum River 1½ miles South of Rte 555

CONSTRUCTION DETAILS

Casing diameter 24" Length of casing [illegible]
Size of screen 24" Length of screen 20'
Type of pump Turbine Test
Capacity of pump 1200 gpm.
Depth of pump setting 45 ft.
Date of completion December 3 1970

BAILING OR PUMPING TEST
(Specify one by circling)

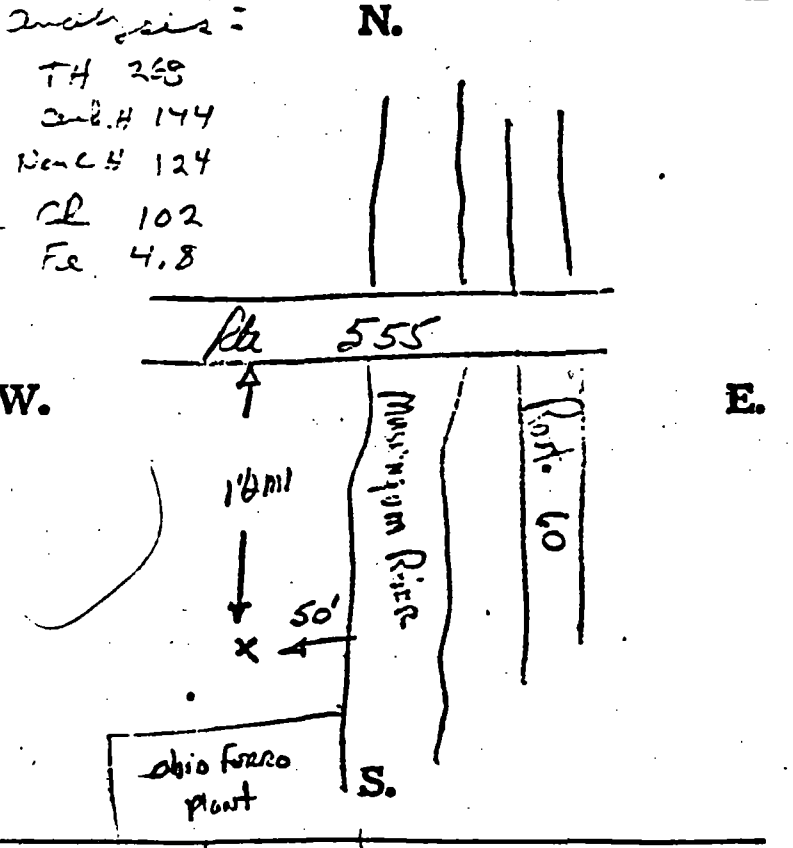
Test Rate 1000 G.P.M. Duration of test 8 hrs.
Drawdown 13 ft. Date 12/16/70
Static level-depth to water [illegible] ft.
Quality (clear, cloudy, taste, odor)
Pump installed by —

WELL LOG*

Formations sandstone, shale, limestone, gravel and clay	From	To
Fill	0 Feet	8 Ft.
Sand, gravel & slate	8	30'
Sand, gravel or clay	30	39'
Sand & gravel some clay	38'	47'
Sandy gravel	47'	67'

SKETCH SHOWING LOCATION

Locate in reference to numbered State Highways, St. Intersections, County roads, etc.



Drilling Firm The Chas Davis Co
Address Macksburg, Ohio

Date January 15, 1971
Signed [illegible]

If additional space is needed to complete well log, use next consecutive numbered form.

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

2GW

WATER ANALYSIS

Location Philo, Ohio (1 mile West)(S½ sec. 10)(Harrison Twp.) County Muskingum
Source Drilled well No. 8 Depth (ft) 67 Diam (in.)
Cased to (ft) Date drilled October 1970 Point of coll. Tap on pump
Owner Ohio Ferro Alloy, Canton, Ohio
Treatment Use Industrial
WBF Sand and gravel, 47-67 WL 13.6 ft. below land surface Yield 1000 GPM pump
Temp (°C) Appear. when coll. Clear
Collected July 20, 1972 By Dave Jobe
Remarks

	mg/l	me/l		mg/l	me/l
Silica (SiO_2)	9.6	—	Bicarbonate (HCO_3)	208	3.41
Aluminum (Al)			Carbonate (CO_3)	0	.00
Iron (Fe) (ug/l)	2800	—			
Manganese (Mn) (ug/l)	1200	—	Sulfate (SO_4)	130	2.71
			Chloride (Cl)	120	3.38
			Fluoride (F)	.5	.03
Calcium (Ca)	100	4.99			
Magnesium (Mg)	23	1.89	Nitrate (NO_3)	.0	.00
Sodium (Na)	60	2.61	Nitrate (NO_3-N)	.0	
Potassium (K)	6.0	.15			
Total		9.64	Total		9.53

	mg/l		
		Specific conductance (micromhos at 25° C)	922
Dissolved solids:			
Calculated	555	pH	7.5
Residue on evaporation at 180° C	592		
		Color	1
Hardness as $CaCO_3$	340		
Noncarbonate	170		

Lab. No. Col 63403 Field No. Project OHIO MAT RES Q GW

PROVISIONAL RECORDS, SUBJECT TO REVISION

UNITED STATES DEPARTMENT OF THE INTERI
GEOLOGICAL SURVEY

2GW

WATER ANALYSIS

Location Lagoon, Ohio (North)(SE¼ sec. 9)(Brush Creek Twp.) County Muskingum
Source Drilled well Depth (ft) ____ Diam (in.) ____
Cased to (ft) ____ Date drilled ____ Point of coll. Tap
Owner Unknown, "Trailer well"
Treatment ____ Use Domestic
SBF ____ WL ____ Yield ____
Temp (°C) ____ Appear. when coll. Clear
Collected July 20, 1972 By Dave Johe
Remarks Sampled after pumping 10 min.

	mg/l	me/l		mg/l	me/l
Silica (SiO_2)	13	--	Bicarbonate (HCO_3)	279	4.57
Aluminum (Al)			Carbonate (CO_3)	0	.00
Iron (Fe) (ug/l)	24,000	--			
Manganese (Mn) (ug/l)	2,200	--	Sulfate (SO_4)	670	13.95
			Chloride (Cl)	6.0	.17
			Fluoride (F)	1.0	.05
Calcium (Ca)	240	11.98			
Magnesium (Mg)	75	6.17	Nitrate (NO_3)	.0	.00
Sodium (Na)	27	1.17	Nitrate (NO_3-N)	.0	
Potassium (K)	2.9	.07			
Total		19.39	Total		18.74

	mg/l		
		Specific conductance (micromhos at 25° C)	1,500
Dissolved solids:		pH	7.2
Calculated	1,200		
Residue on evaporation at 180°C	1,310	Color	0
Hardness as $CaCO_3$	910		
Noncarbonate	660		

Lab. No. Col 63404 Field No. Project OHIO NAT RES Q GW